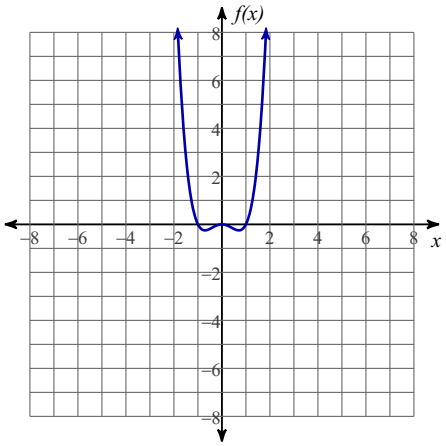
Precalculus Name_____ ID: 1

Unit 1 Review 1

Date_____ Period____

Approximate all points of relative and absolute extrema of each function.

1)



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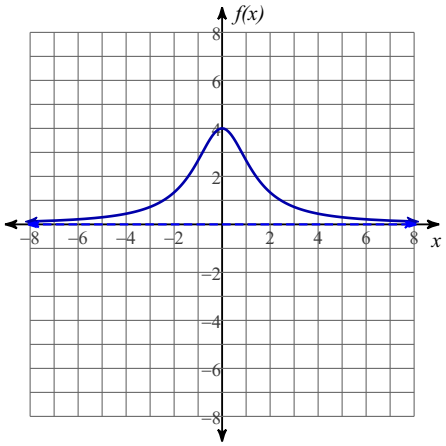
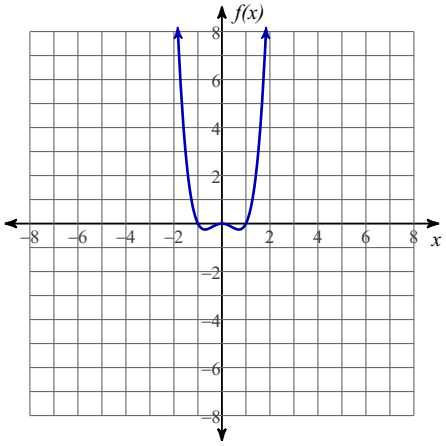


Approximate the intervals where each function is increasing and decreasing.

3)



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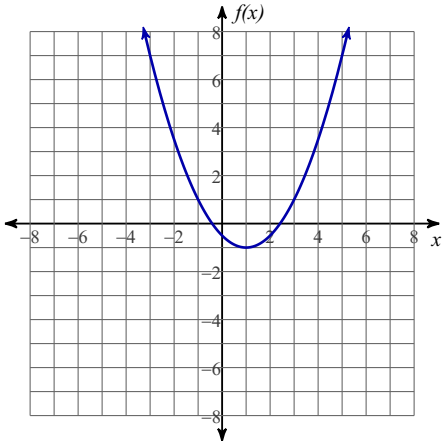
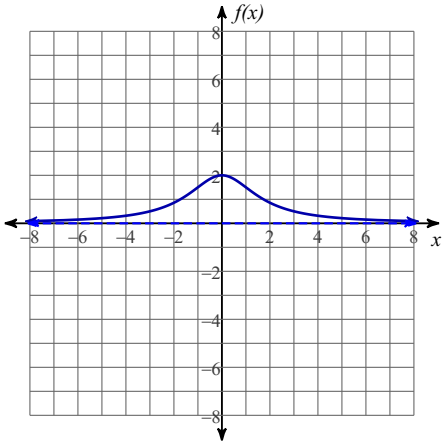


Approximate all points of relative and absolute extrema of each function. Then approximate the open intervals where each function is increasing and decreasing.

5)



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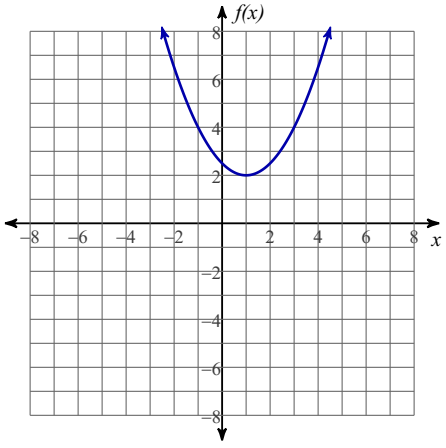
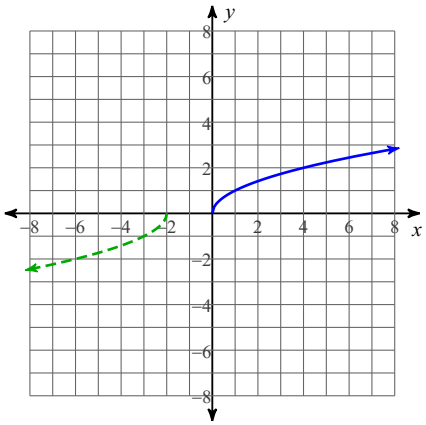


Write $g(x)$ (dashed line) in terms of $f(x)$ (solid line).

7)



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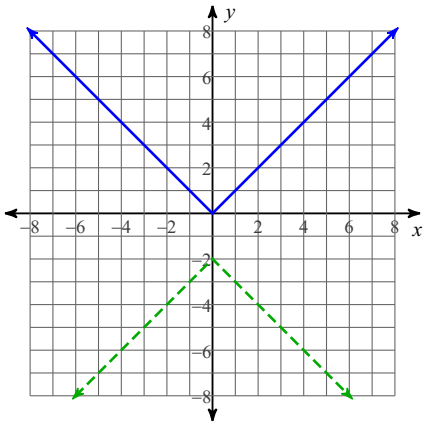

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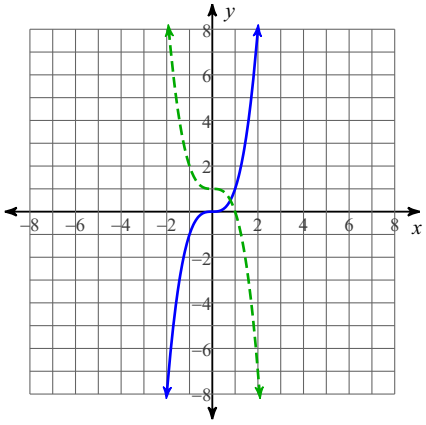

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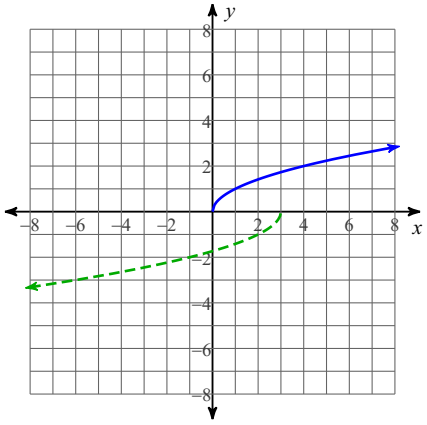


Describe the transformations necessary to transform the graph of $f(x)$ into that of $g(x)$.

11) $f(x) = \sqrt{x}$
$g(x) = 2\sqrt{-(x+3)}$

12) $f(x) = x^2$
$g(x) = (3(x+3))^2 - 2$

13) $f(x) = |x|$
$g(x) = -3|x-2|$

14) $f(x) = \sqrt{x}$
$g(x) = -\sqrt{-\frac{1}{2}x + 1}$

Sketch the graph of each function.

15) $g(x) = -3\sqrt{-(x-1)} - 1$

16) $g(x) = -\left|\frac{1}{3}(x+2)\right| - 2$

17) $g(x) = -\left(\frac{1}{3}(x-2)\right)^3 + 3$

18) $g(x) = -\frac{1}{2(x+3)} + 1$

Transform the given function $f(x)$ as described and write the resulting function as an equation.

19) $f(x) = \sqrt{x}$
reflect across the y-axis
expand vertically by a factor of 2
reflect across the x-axis
translate right 2 units
translate up 1 unit

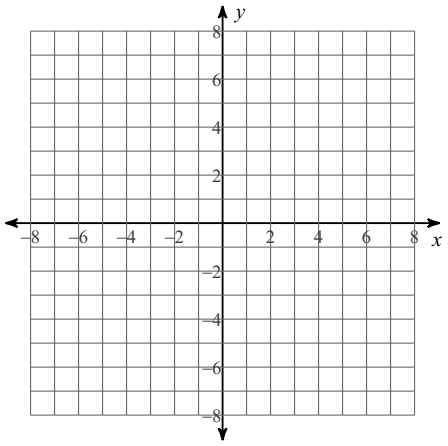
20) $f(x) = \dfrac{1}{x}$
compress horizontally by a factor of 2
reflect across the x-axis
translate right 3 units
translate up 1 unit

21) $f(x) = \dfrac{1}{x}$
compress horizontally by a factor of 3
reflect across the x-axis
translate right 2 units
translate down 1 unit

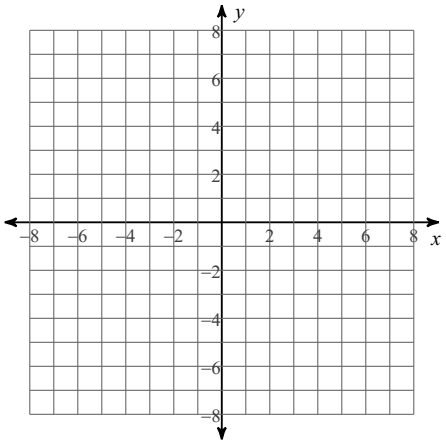
22) $f(x) = |x|$
expand vertically by a factor of 3
reflect across the x-axis
translate left 2 units
translate down 3 units

Sketch the graph of each function.

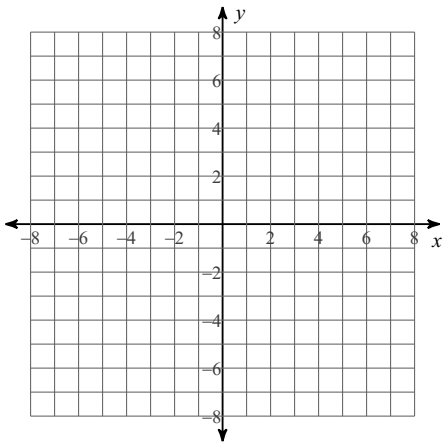
23) $g(x) = \begin{cases} \sqrt{-x}, & x \le -1 \\ (x-1)^3, & x \ge 0 \end{cases}$



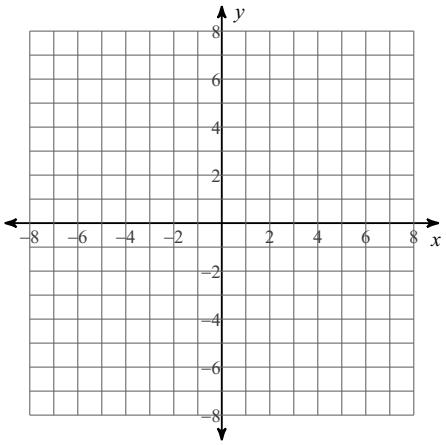
24) $f(x) = \begin{cases} 6, & x < -3 \\ -2, & -3 \le x < 3 \\ \sqrt{x}, & x \ge 3 \end{cases}$



25) $g(x) = \begin{cases} -5, & x \le 2 \\ (x-3)^3, & x > 2 \end{cases}$



26) $f(x) = \begin{cases} 4, & x \le -4 \\ -x-2, & -4 < x \le 0 \\ \sqrt{x-2}, & x > 0 \end{cases}$



Perform the indicated operation.

27) $g(a) = a^2 - 1$
$h(a) = a + 5$
Find $\left(\frac{g}{h}\right)(a)$

28) $g(x) = x - 2$
$h(x) = x^2 - 5x$
Find $(g - h)(x)$

29) $f(t) = t^2 + 4t$
$g(t) = t + 5$
Find $(3f + 3g)(t)$

30) $f(n) = n^3 + 4$
$g(n) = 3n + 3$
Find $(f + g)(n)$

31) $f(n) = 2n + 1$
$g(n) = 2n + 5$
Find $(f \circ g)(-5)$

32) $f(x) = 4x + 5$
$g(x) = 2x + 4$
Find $(f \cdot g)(0)$

33) $f(n) = n^3 + 2n$
$g(n) = -3n - 5$
Find $(3f + 5g)(-4)$

34) $f(n) = 2n - 4$
$g(n) = n^3 - 2n$
Find $(f - g)(-6)$

35) $g(x) = 3x - 2$
$f(x) = x^2 - 5$
Find $(g - f)(3x)$

36) $g(x) = x^2 + 2 + 2x$
$h(x) = x + 4$
Find $(g \cdot h)(x - 2)$

37) $h(a) = -2a + 3$
$g(a) = a^2 - a$
Find $(h - g)(a - 1)$

38) $g(n) = -2n - 4$
$f(n) = -2n^2 + 3$
Find $(g \cdot f)(x^2)$

Find the inverse of each function.

39) $f(n) = 3 + 2n^5$

40) $f(x) = -x^3 + 1$

41) $f(n) = \sqrt[5]{n - 1} - 1$

42) $f(x) = \frac{-2 + \sqrt[3]{4x}}{2}$

Answers to Unit 1 Review 1 (ID: 1)

1) Absolute minima: $(-0.7, -0.3)$, $(0.7, -0.3)$
Relative maximum: $(0, 0)$

2) No absolute or relative minima.
Absolute maximum: $(0, 4)$

3) Increasing: $(-0.7, 0)$, $(0.7, \infty)$ Decreasing: $(-\infty, -0.7)$, $(0, 0.7)$

4) Increasing: $(1, \infty)$ Decreasing: $(-\infty, 1)$

5) No absolute or relative minima.
Absolute maximum: $(0, 2)$
Increasing: $(-\infty, 0)$ Decreasing: $(0, \infty)$

6) Absolute minimum: $(1, 2)$
No absolute or relative maxima.
Increasing: $(1, \infty)$ Decreasing: $(-\infty, 1)$

7) $g(x) = -f(-(x + 2))$

8) $g(x) = -f(x) - 2$

9) $g(x) = -f(x) + 1$

10) $g(x) = -f(-(x - 3))$

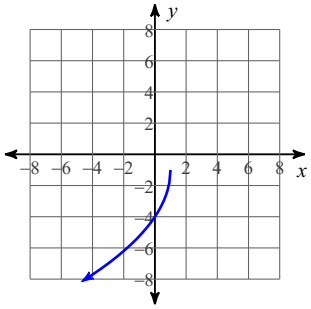
11) reflect across the y-axis
expand vertically by a factor of 2
translate left 3 units

12) compress horizontally by a factor of 3
translate left 3 units
translate down 2 units

13) expand vertically by a factor of 3
reflect across the x-axis
translate right 2 units

14) expand horizontally by a factor of 2
reflect across the y-axis
reflect across the x-axis
translate up 1 unit

15)



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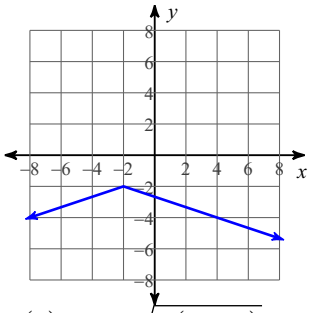

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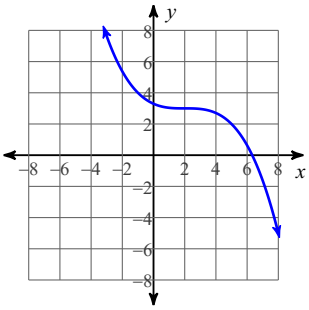

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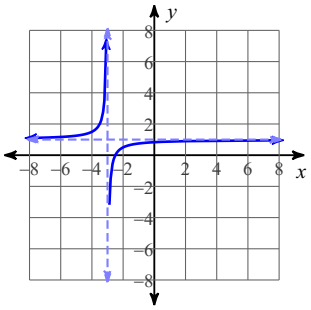


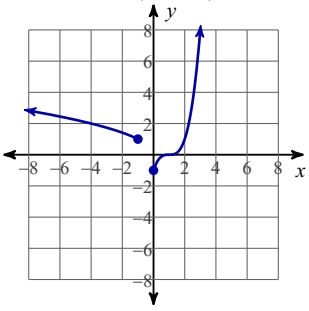
19) $g(x) = -2\sqrt{-(x - 2)} + 1$

20) $g(x) = -\dfrac{1}{2(x - 3)} + 1$

21) $g(x) = -\dfrac{1}{3(x - 2)} - 1$

22) $g(x) = -3\left|x + 2\right| - 3$

23)



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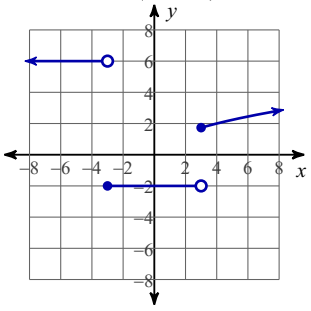
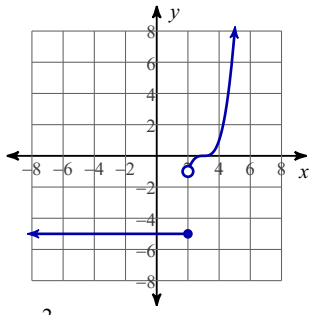
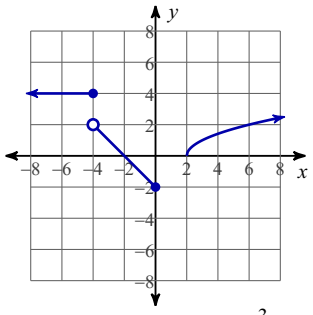


25) 

26) 

27) $\dfrac{a^2-1}{a+5}$

28) $-x^2+6x-2$

29) $3t^2+15t+15$

30) n^3+3n+7

31) -9

32) 20

33) -181

34) 188

35) $-9x^2+9x+3$

36) x^3-2x+4

37) $-a^2+a+3$

38) $4x^6+8x^4-6x^2-12$

39) $f^{-1}(n)=\sqrt[5]{\dfrac{n-3}{2}}$

40) $f^{-1}(x)=\sqrt[3]{-x+1}$

41) $f^{-1}(n)=1+(n+1)^5$

42) $f^{-1}(x)=2(x+1)^3$